



*Date of Application, 31st Dec., 1892—Accepted, 11th Feb., 1893*

### COMPLETE SPECIFICATION.

#### Improvements in Apparatus for Hypodermic and other Injections.

I, GABRIEL BAÏ, Doctor of Medicine, of 15<sup>bis</sup>, Boulevard St. Denis, Paris, in the Republic of France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement and accompanying drawings, that is  
5 to say :—

My present invention relates to an improved system of apparatus for making injections of any kind, but more especially hypodermic injections.

It has for its object to remedy the inconveniences of the ordinary systems in which syringes and pistons are used, inconveniences of which one of the most  
10 serious is the drying up of the packing of leather or vegetable or other substance not easily rendered antiseptic, which prevents such apparatus from being reliably in a proper state to work.

The irregularity of the bore of the glass tubes employed also renders their construction defective.

15 In my present invention I use an arrangement of apparatus which is very simple and is always ready for use without preparation, and which consists in principle of a circular box or case closed on one side by a flexible membrane or diaphragm, and on the other by a rigid cover.

This box contains the liquid which is to be injected, and the injection is effected  
20 by pressure upon the membrane.

Moreover the apparatus is so constructed that the exact quantity of the liquid to be injected is determined either by a special arrangement of the apparatus, or more simply by graduated marks upon the box or case.

In order that my invention may be more readily understood, I have shewn in  
25 the accompanying drawings arrangements by which it can be carried out, but by way of illustration only.

Figures 1 and 2 represent respectively the two sides of the apparatus.

Figure 3 shews the entire apparatus viewed from the side.

Figure 4 is a vertical section.

30 Figure 5 represents a form of the same apparatus having a slight variation consisting of graduated marks engraved upon a glass which forms in this case the bottom of the box.

Figure 6 represents a side view of this form and Figure 7 a vertical section.

Figure 8 is a side view shewing the membrane or diaphragm.

35 In the different figures the same letters of reference represent the same parts.

My apparatus shewn in section in Figure 4 consists in principle of a receiver, formed by an annular frame *a* over which is stretched and hermetically fixed in any suitable manner, but more especially by its own elasticity, a flexible mem-  
brane *b*, preferably of india rubber, in the centre of which is fitted a metallic  
40 disc *c* which may be kept in its position by means of a rivet *d* which nevertheless allows a circular movement to be given to the button *i*.

This arrangement allows the apparatus to be taken to pieces and the india rubber membrane to be taken off in order to clean it.

The opposite side of the box or case is formed of a plate *e* preferably of glass,  
45 mounted upon the frame *a* in any suitable manner but preferably by a soldered joint obtained by means of a galvanic deposit, so as to ensure its tightness, and for antiseptic purposes to be able to immerse the apparatus in boiling water.

Upon the frame *a* is fixed by solder or other suitable means a discharge pipe *f* through which passes longitudinally a passage *g* by which communication is made  
50 between the interior of the box or case and the injecting needle.

[Price 8d.]



*Bay's Improvements in Apparatus for Hypodermic and other Injections.*

The pin or stud *i* which plays a double part, that of a regulator by which the dose to be injected is to be determined, and also as a means by which the injection is effected by pressure, has one end provided with a flange *k* carrying an index hand *l* which turns upon the graduated disc *c*, whilst the other end of the stud *i* terminates in a button *m* to which pressure can be applied. 5

The cam *k* is guided by and presses against an arm *h* either fixed or moveable by means of a nut as shewn at *x* in Figures 3 and 4, and the stud *i* passes through and turns in the end of the arm *h*.

My apparatus may also have the slightly modified arrangement illustrated in Figures 5 to 8. 10

In this form the flexible membrane *b*, the disc *c*, and the button *m*, may be firmly attached together by a screw *n*, as the section Figure 7 shews, and in order to determine the dose of liquid to be introduced into the apparatus, the index hand *l* in the form shewn in Figures 1 and 4 is replaced by simple graduated marks upon the glass bottom *e*. 15

The method of operation is as follows:—

In order to charge the instrument it is sufficient to plunge the discharge pipe *f* into the bottle, and the liquid to be injected can then be drawn directly up by operating the button *m*.

To effect the injection the tubular needle *o* Figure 3, is fixed upon the discharge pipe and the same movement of pressure determines the discharge of the liquid. 20

In the form represented in Figures 1 to 4 the quantity is determined by the greater or less movement of the membrane *b* towards the cover by means of the cam *k* which is turned by the button *m* until the determined graduation has been reached. This movement depresses the membrane which fits exactly against the sides without leaving any space at the edge of the annular frame *a* which is hollowed out in the form of a cone inside, the smaller end of such cone being formed by the glass bottom, and the capacity of the box or case is thus diminished in proportion to the advance of the cam towards its highest point, this capacity determining the quantity of the liquid. 25 30

In the form shewn in Figures 5 to 8 the quantity is determined by simply observing the height of the liquid in the box when held vertically, the discharge pipe *f*, being uppermost, and the height being indicated by the graduated marks upon the glass plate *e*.

As the apparatus can be operated with only one hand great convenience is afforded to the operator. 35

It is to be understood that I do not confine myself to any particular form or dimensions of the instrument or to the materials of which it is made, which may be varied more or less as may be found desirable, but

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:— 40

The apparatus or instrument for hypodermic and other injections, consisting of a box circular or of other convenient shape, one side of which is formed of a stretched membrane upon which pressure can be exerted by means of a device serving to determine the quantity of liquid to be injected, substantially as and for the purpose described and illustrated. 45

Dated this 31st day of December 1892.

EDWARDS & Co.,  
35, Southampton Buildings, London, Agents for the Applicant. 50





SHEET 1.

FIG. 1.

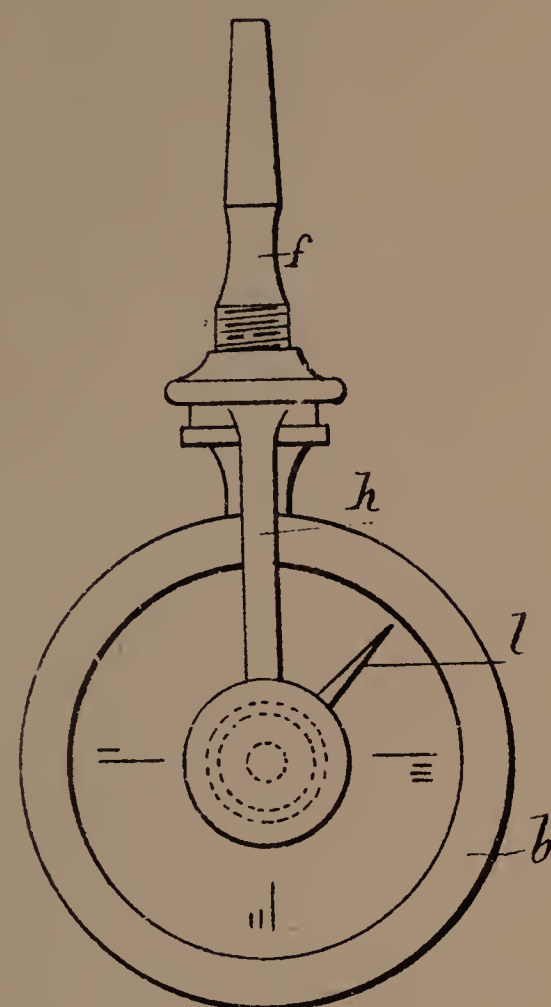


FIG. 2.

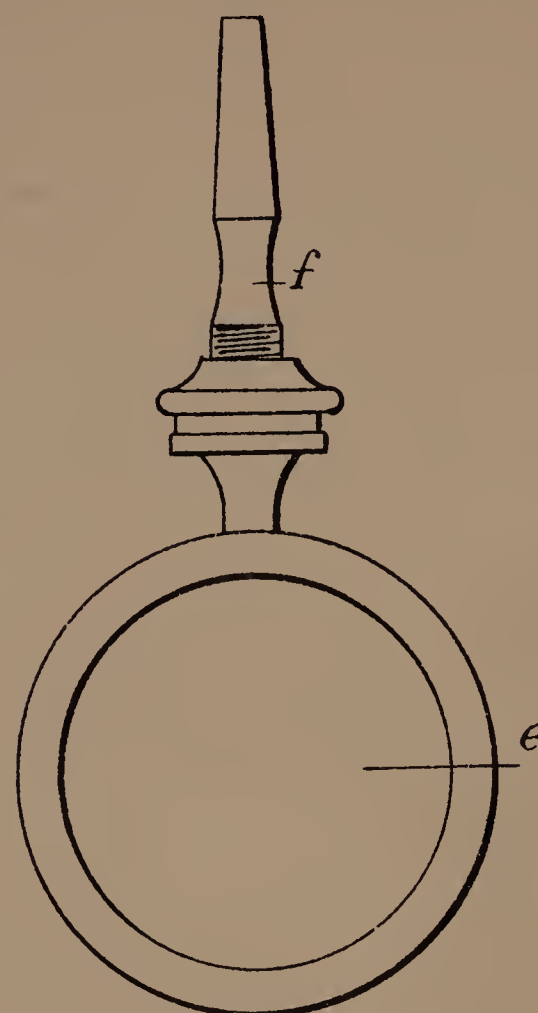


FIG. 3.

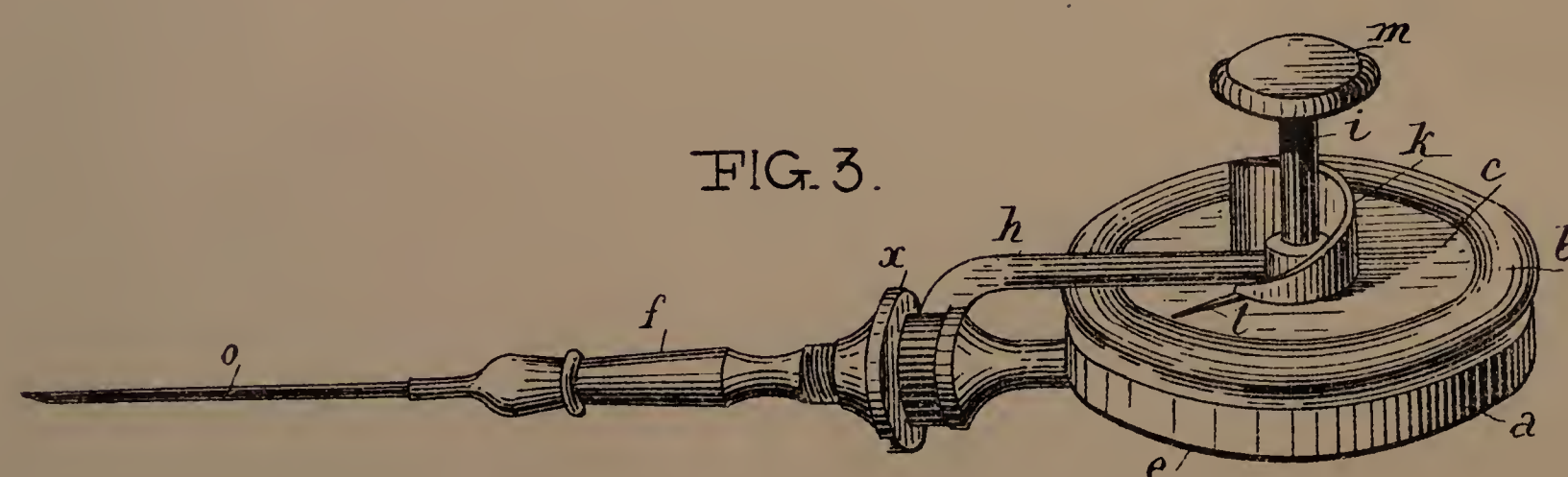


FIG. 4.

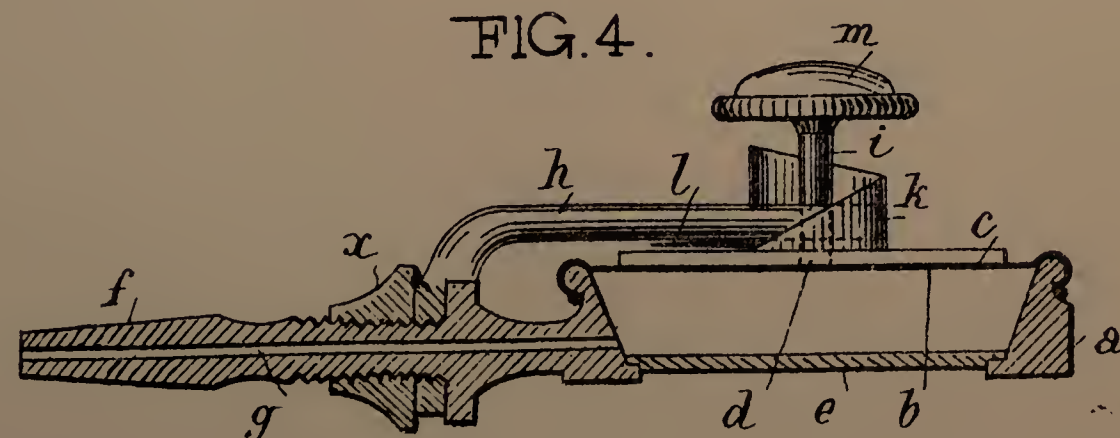


FIG. 5.

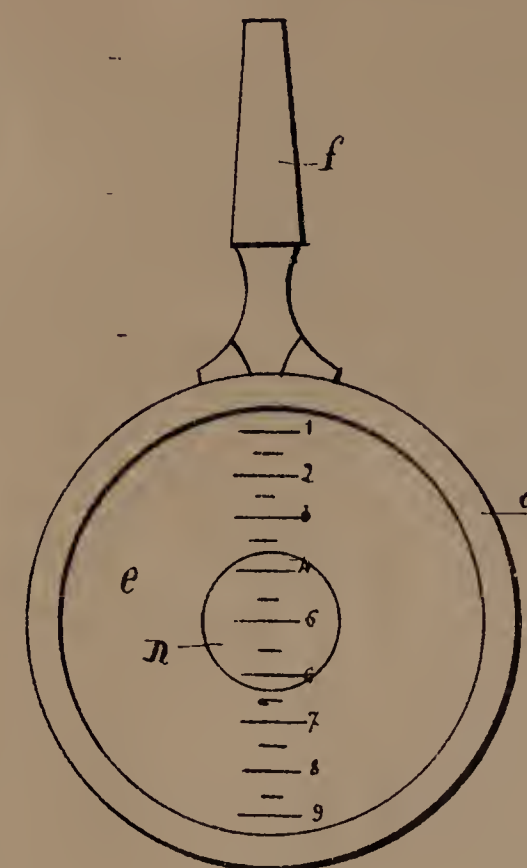


FIG. 8.

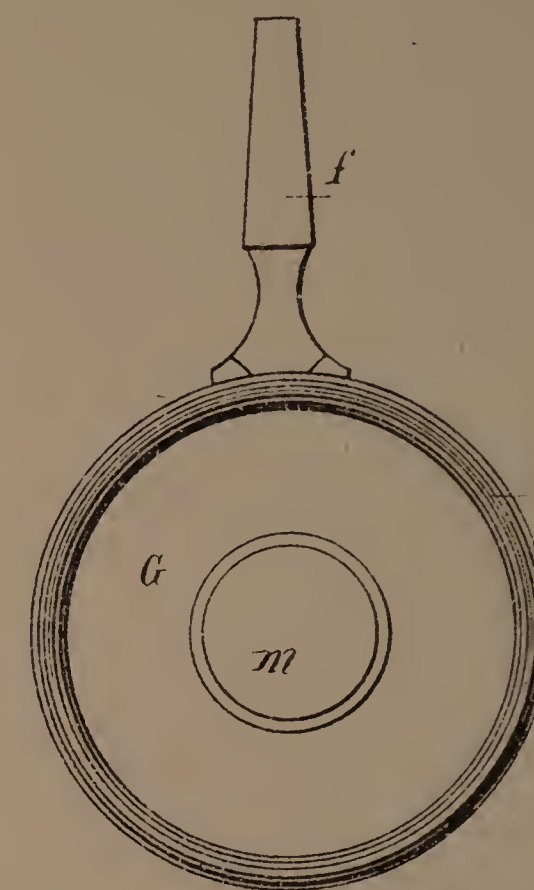


FIG. 6.

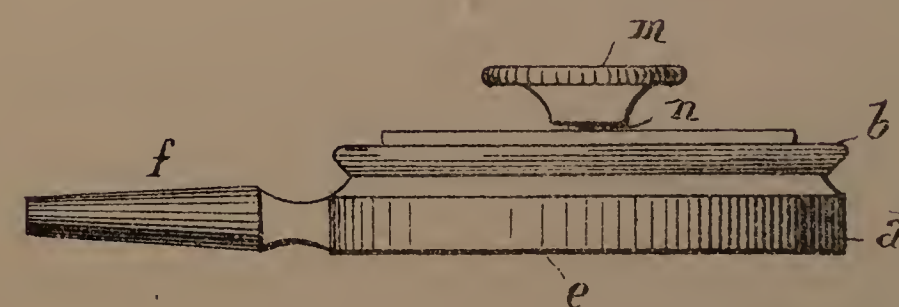


FIG. 7.

